

### **REMARKS/ARGUMENTS**

Applicant acknowledges receipt of the Office Action dated May 3, 2007 (hereinafter '*Office Action*') in which:

- Claims 1, 20-41 are rejected under 35 U.S.C. § 102(b) or in the alternative under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,773,690 by Norweck et al (hereinafter referred to as '*Norweck*');
- Claims 1, 20-31 and 33-41 are rejected under 35 U.S.C. § 102(b) or in the alternative under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,831,007 by Murrell et al (hereinafter referred to as '*Murrell*');
- Claims 42-48, 60-66 and 75-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Norweck* in view of U.S. Patent No. 6,531,517 by Watcher et al (hereinafter referred to as '*Watcher*');
- Claims 42-48, 60-66, 75-79 and 81-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murrell* in view of *Watcher*;
- Claims 1, 20-70 and 73-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Norweck* in view of WO 03/012008 by Van Berge et al (hereinafter referred to as '*Van Berge*');
- Claims 1, 20-31, 33-70, 73-79 and 81-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murrell* in view of *Van Berge*;
- Claims 1, 20-70 and 73-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Norweck* in view of WO 01/767735 by Khare (hereinafter referred to as '*Khare*'); and
- Claims 1, 20-31, 33-70, 73-79 and 81-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murrell* in view of *Khare*.

#### **I. Status of the claims**

By this response, Claims 1, 20, 23, 29, 42, 70, 77 are currently amended. Claims 21, 24-26, 30, 34, 40-41, 75, 78, 85, 87-88 & 91-92 are canceled. Claims 93-101 are newly added. The claim amendments and new claims (including the showing of the support from the specification) are described in the Amendment to the Claims and New Claims sections below.

**Claims 1, 20, 22-23, 27-29, 31-33, 35-39, 42-70, 73-74, 76-77, 79-84, 86, 89-90 & 93-101 are currently pending.**

Claim 1 is an independent claim from which Claims 95-98 depend; Claim 20 is an independent claim from which Claims 21-22-23, 27-29, 31-33, 35-39 & 99-100 depend; Claim 42 is an independent claim from which Claims 43-70, 73-74, 76-77, 79-84, 86, 89-90 & 101 depend; and Claim 70 is an independent claim from which Claims 93-94 depend.

## **II. Amendments to the Claims**

By this response, Claims 1, 20, 23, 29, 42, 70 & 77 were amended. For the support of these amendments, all cited paragraph and page numbers originate from the specification as filed. These amendments do not constitute new matter.

The amendment of Claim 1 is supported by at least original Claims 2, 5, 12, 14 & 19, paragraph [0036] on pg. 14, and paragraphs [0040]-[0042] on pg. 15-16 of the specification. Claim 1 as currently amended is as follows:

*A method of making a stabilized transition alumina catalyst support comprising:*

*(a) introducing by impregnation at least one structural stabilizer precursor comprising at least one element selected from the group consisting of boron, cobalt, zirconium and combinations thereof to a transition alumina comprising a phase selected from the group consisting of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>,  $\delta$ -Al<sub>2</sub>O<sub>3</sub>,  $\theta$ -Al<sub>2</sub>O<sub>3</sub> and any combination thereof, to provide a stabilizer-impregnated alumina; and*

*(b) optionally, drying the stabilizer-impregnated alumina;*

*(c) steaming the stabilizer-impregnated alumina at conditions sufficient to at least partially transform the stabilizer-impregnated alumina to at least one phase selected from the group consisting of boehmite, pseudoboehmite, and combination thereof and to form a stabilizer-containing boehmite alumina, wherein said sufficient conditions comprise a temperature between 180° C and 300° C; and*

*(d) calcining the stabilizer-containing boehmite alumina at a temperature between 400° C and 900° C to form a stabilized transition alumina catalyst support comprising a  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> phase and a pore volume from 0.2 cm<sup>3</sup>/g to 0.6 cm<sup>3</sup>/g.*

The amendment of Claim 20 is supported by at least original Claims 21, 24, 25 and by paragraph [0036] on pg. 14, paragraph [0043] on pg. 17 and paragraph [0049] on pg. 18 of the specification. Claim 20 as currently amended is as follows:

*A method of making a stabilized transition alumina catalyst support comprising:*

*(a) steaming a transition alumina comprising a phase selected from the group consisting of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>,  $\delta$ -Al<sub>2</sub>O<sub>3</sub>,  $\theta$ -Al<sub>2</sub>O<sub>3</sub> and any combination thereof, said steaming being carried out at conditions sufficient to at least partially transform the transition alumina to at least one phase selected from the group consisting of boehmite,*

*pseudoboehmite and combination thereof, and to form a boehmite alumina, wherein said sufficient conditions comprise a temperature between 180° C and 300° C;*

*(b) introducing by impregnation to the boehmite alumina at least one structural stabilizer precursor to provide a stabilizer-containing boehmite alumina;*

*(c) optionally, drying the stabilizer-containing boehmite alumina; and*

*(d) calcining the stabilizer-containing boehmite alumina at a temperature between 400° C and 900° C to form a stabilized transition alumina catalyst support, said stabilized transition alumina catalyst support comprising a  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> phase and a pore volume ranging from 0.2 cm<sup>3</sup>/g to 0.6 cm<sup>3</sup>/g.*

The amendment of Claim 42 is supported by at least original Claims 21, 24, 25, 34, 41 and by paragraph [0036] on pg. 14, paragraphs [0040]-[0043] on pg. 15-16, paragraph [0045] on pg. 17 and paragraph [0049] on pg. 18 of the specification. Claim 42 as currently amended is as follows:

*A method for making a stabilized transition alumina catalyst support and preparing a Fischer-Tropsch catalyst supported on said stabilized transition alumina catalyst support, said method comprising the following steps for making a stabilized transition alumina catalyst support:*

*(i) steaming a transition alumina comprising a phase selected from the group consisting of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>,  $\delta$ -Al<sub>2</sub>O<sub>3</sub>,  $\theta$ -Al<sub>2</sub>O<sub>3</sub> and any combination thereof, said steaming step being carried out at conditions sufficient to at least partially transform the transition alumina to at least one phase selected from the group consisting of boehmite, pseudoboehmite and combination thereof, and to form a boehmite material, wherein said sufficient conditions comprise a temperature between 180° C and 300° C;*

*(ii) before or after the steaming step (i),-impregnating at least one structural stabilizer, whereby a stabilizer-containing boehmite alumina is generated from steps (i) and (ii); and*

*(iii) then calcining the stabilizer-containing boehmite alumina at a temperature between 400° C and 900° C to yield the stabilized transition alumina catalyst support, said stabilized transition alumina catalyst support comprising a  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> phase and a pore volume from about 0.2 cm<sup>3</sup>/g to about 0.6 cm<sup>3</sup>/g; and*

*said method further comprising the following steps for making the Fischer-Tropsch catalyst:*

*(a) introducing at least one catalytic metal precursor to the stabilized transition alumina catalyst support of step (iii) to provide a catalyst-impregnated support;*

*(b) optionally, introducing at least one cocatalytic metal precursor to the catalyst-impregnated support to provide a cocatalyst-impregnated support;*

*(c) optionally, introducing at least one promoter precursor to the cocatalyst-impregnated support to provide a promoter-impregnated support;*

*(d) optionally, drying the catalyst-impregnated support at conditions effective for removing any solvents used in introducing at least one of the precursors of steps (a), (b) and (c), wherein drying provides a dried catalyst-impregnated support; and*

*(e) calcining the catalyst-impregnated support at conditions effective for decomposing at least one of the precursors of steps (a), (b) and (c) to the corresponding oxides.*

The amendment of Claim 70 is supported by at least original Claims 21, 24, 25, 41 and by paragraph [0036] on pg. 14, paragraphs [0040]-[0043] on pg. 15-16, paragraphs [0044]-[0045] on pg. 17 and paragraph [0049] on pg. 18 of the specification. Claim 70 as currently amended is as follows:

*A process for producing a product mixture comprising paraffinic hydrocarbons, comprising:*

*contacting a reactant gas mixture comprising synthesis gas with a catalyst under conditions and in a reactor effective for at least partially transforming the synthesis gas to the product mixture, wherein the catalyst comprises*

*a stabilized transition alumina catalyst support comprising a  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> phase and a pore volume between 0.2 cm<sup>3</sup>/g and 0.6 cm<sup>3</sup>/g,*

*at least one catalytic metal;*

*optionally at least one cocatalytic metal;*

*and optionally at least one promoter,*

*wherein the stabilized transition alumina catalyst support is characterized by the presence of at least one structural stabilizer selected from the group consisting of boron, magnesium, silicon, calcium, titanium, chromium, manganese, iron, cobalt, nickel, copper, zinc, gallium, strontium, zirconium, barium, selenium and the lanthanides, including lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium, and further*

*wherein the stabilized transition alumina catalyst support is made by a method comprising steaming a transition alumina comprising a phase selected from the group consisting of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>,  $\delta$ -Al<sub>2</sub>O<sub>3</sub>,  $\theta$ -Al<sub>2</sub>O<sub>3</sub> and any combination thereof at conditions comprising a temperature between 180° C and 300° C sufficient to at least partially transform said transition alumina to at least one phase selected from the group consisting of boehmite, pseudoboehmite, and combination thereof, and to form a boehmite material, said steaming step being carried out before or after impregnation of a structural stabilizer precursor, whereby a stabilizer-containing boehmite alumina is generated, and then calcining the stabilizer-containing boehmite alumina at a temperature between 400° C and 900° C to yield the stabilized transition alumina catalyst support.*

Claims 23, 77 were amended to remove  $\gamma$ -alumina from the Markush group of the stabilized transition alumina, since the stabilized transition alumina already comprises  $\gamma$ -alumina in the independent Claims 20 and 42 from which each respectively depends.

Claim 29 was amended to remove a temperature range which is broader than the range recited in the steaming step (a) of Claim 20 from which this claims depends.

### **III. Rejections over *Norweck***

Claims 1 & 20-41 were rejected under 102(b) or in the alternative under 103(a) over *Norweck*. Claims 21, 24-26, 30, 34 & 40-41 were canceled in this response. As such, Applicant will address the rejection of Claims 1, 20, 22-23, 27-29, 31-33 & 35-39.

In view of the amendments to Claims 1 and 20 from which the other rejected claims depend, Applicant respectfully traverses the rejection of these claims based on *Norweck* for lack of *prima facie* anticipation and obviousness.

Applicant asserts that *Norweck* does not provide all of the elements of independent Claims 1 and 20 (as required under MPEP 2131 and 2143.03) and *a fortiori* of all of the elements of their respective pending dependent claims rejected on the same basis. Moreover, there is no guidance to the artisan from *Norweck* to modify their teachings to arrive to the present Claims 1 & 20. For example, there is a teaching away from *Norweck* to use 'stabilization aids' for alumina, and *Norweck* specifically developed methods of preparation in order to avoid using these stabilization aids. There is further no teaching or suggestion from *Norweck* in modifying the preparation method in order to obtain a stabilized alumina with a lower pore volume range as recited in independent Claims 1 and 20.

*Norweck*, as a whole, teaches a method to prepare crystalline boehmitic aluminas which exhibit unusual structural features in the 020 and 120 space direction (see *Norweck's* Abstract). These crystalline boehmitic aluminas are obtained by long-time hydrothermal aging of aluminum oxide hydrates (also called aluminum oxide hydroxides) in the presence of water and metallic or non-metallic oxides. See *Norweck* Col. 2 lines 32-34.

Contrary to what the Office Action states on page 2, *Norweck* does not teach the characteristics of the stabilized alumina (now recited in steps (d) of both Claims 1 and 20) obtained from the claimed preparation methods. *Norweck* identifies his aluminum oxides as distinguished (among others properties) by their particularly *large pore volumes*. See *Norweck* Col. 3 lines 44-46. Indeed, *Norweck* discloses that the method of preparation results in forming crystalline boehmitic aluminas having large pore volumes, i.e., greater than 0.6 cm<sup>3</sup>/g (*Norweck* Col. 4 lines 15-16), or greater than 0.7 cm<sup>3</sup>/g (*Norweck* Col. 3 lines 34-35) or greater than 0.8 cm<sup>3</sup>/g (*Norweck* Col. 3 lines 28-29), or greater than 0.9 cm<sup>3</sup>/g (*Norweck* Col. 3 lines 29 & 35-36). The disclosed pore volumes in *Norweck* are larger than the pore volume range recited in Claims 1 and 20.

Second, the resulting aluminum oxide in *Norweck* does not contain a  $\gamma$ -alumina phase, as recited in Claims 1 and 20 (see step (d)). To the contrary, *Norweck* discloses that the aluminum oxides are “pure-phase and stable-phase products which are present as delta, theta, or alpha modifications, depending on the calcination time and temperature”. See *Norweck* Col. 3 lines 52-54. The disclosed examples calcined at 1200°C in *Norweck* further illustrate the significant alpha-phase signals (see *Norweck* Ex. 1; Col 5 lines 39; table 1) or theta-phase signals (see *Norweck* Ex. 2 lines 53-54; table 2).

As for motivation for making the modification in *Norweck*'s method to arrive to the present methods of Claims 1 and 20, there is no suggestion from *Norweck* that the introduction of the structural stabilizer precursor could be done by impregnation as recited in step (a) of Claim 1 and further in step (b) of Claim 20.

Additionally, *Norweck* specifically teaches that with the developed method of preparation of these aluminum oxides, *“stabilization aids employed in technical applications can mostly be dispensed with”*. See *Norweck* Col. 4 lines 35-36. According to *Norweck*, stabilization aids made of metal oxides can have adverse effects on the catalytic behavior of the alumina catalyst or catalyst support. See *Norweck* Col. 4 lines 37-39. Thus, *Norweck* intentionally developed a preparation method which omits the use of stabilization aids. Indeed in preferred embodiments, the crystalline aluminas obtained by *Norweck* are free from any foreign atoms, particularly other metal atoms. See *Norweck* Col. 3 lines 18-21.

Because *Norweck* is aiming at an alumina of pure-phase and stable-phase products which are present as delta, theta, or alpha phase (*Norweck* Col. 3 lines 51-65), there is no suggestion from *Norweck* in lowering the calcination temperature to the lower temperature range as recited in steps (d) of Claims 1 and 20, and thus there is no motivation for the artisan to do so in view of *Norweck*'s teaching.

As for the pore volume of the resulting alumina material, *Norweck* highlights the advantage of achieving a high large pore volume of the aluminum oxide materials that are generated by *Norweck*'s preparation methods. Thus Applicant sees no motivation for the artisan to use *Norweck*'s teachings in order to generate an alumina material with a lower pore volume range recited in Claims 1 and 20 (see steps (d) in these claims).

For at least the foregoing reasons, Applicant believes that the rejections of Claims 1 and 20 over *Norweck* are not *prima facie*, and that these independent Claims 1, 20 and their respective dependent claims are patentable over this reference. Applicant respectfully requests the withdrawal of the rejections on Claims 1, 20, 22-23, 27-29, 31-33 & 35-39 based on *Norweck*.

#### **IV. Rejections over *Murrell***

Claims 1, 20-31 and 33-41 were rejected under 102(b) or in the alternative under 103(a) as being unpatentable over *Murrell*. Claims 21, 24-26, 30, 34, 40-41 were canceled in this response. As such, Applicant will address the rejection of Claims 1, 20, 22-23, 27-29, 31, 33 and 35-39.

In view of the amendments to Claims 1 and 20 from which the other rejected claims depend, Applicant respectfully traverses the rejection based on *Murrell* for lack of *prima facie* anticipation and obviousness.

Applicant argues that *Murrell* does not provide all of the elements of independent Claims 1 and 20 (as required under MPEP 2131 and 2143.03) and *a fortiori* of all of the elements of the pending dependent claims rejected on the same basis. Moreover, there is no guidance to the artisan from *Murrell* about modifying his teachings to arrive to the present Claims 1, 20, 22-23, 27-29, 31, 33 and 35-39. For example, there is no motivation for the artisan to modify the method of *Murrell* to arrive to the present methods of Claims 1 and 20, as doing so would remove a key feature of *Murrell*'s supported catalyst.

*Murrell*, as a whole, teaches the preparation method of useful cracking catalysts and catalyst supports comprising mixtures of silica and tungsten oxide supported on a boehmite-like surface. The preparation method includes "*compositing particles of boehmite with particles of silica and tungsten oxide and steaming the composite at a temperature of at least about 500°C for a time sufficient for at least a portion of the silica and tungsten oxide to react with the surface of the boehmite*". See *Murrell* Col. 2 lines 45-50. In preferred embodiments, steaming in *Murrell*'s method is carried out at an even higher temperature, i.e., of at least about 700°C. See *Murrell* Col 2 lines 54-55. *Murrell* further teaches that the boehmite at these high-temperature steaming conditions converts to  $\gamma$ -alumina in the bulk structure and to a transitional state as a boehmite-like surface phase which is created by reaction of silica and tungsten oxide with the boehmite surface. See *Murrell* Col. 2 line 63 to Col. 3 line 8.

The methods of Claims 1 and 20 are distinguished from *Murrell*'s method, because *Murrell* does not teach or suggest the sufficient conditions during the steaming step (referring to step (c) in Claim 1 and to step (a) in Claim 20) which comprise a temperature between 180° C and 300° C. Rather, *Murrell* teaches using temperatures higher than 500°C during the steaming step. See *Murrell* Col. 2 lines 45-50 & 54-55.

Additionally, *Murrell* does not teach steaming a transition alumina or a stabilizer-impregnated transition alumina to at least partially transform it (in the presence of silica and tungsten oxide) to at least one phase selected from the group consisting of boehmite, pseudoboehmite, and combination thereof, as recited in Claims 1 and 20. To the contrary, *Murrell* teaches that the reverse transformation of a boehmite to a transition alumina phase ( $\gamma$ -alumina) takes place at the higher steaming temperatures used by *Murrell*. Indeed, during the high-temperature steaming step in *Murrell*, the boehmite material (not a transition alumina) converts to  $\gamma$ -alumina (a transition alumina). See *Murrell* Col. 2 line 64; Col. 3 line 1 & 26-29. *Murrell* hypothesizes that the boehmite undergoes dehydration (loses water) at these elevated temperatures. See *Murrell* Col. 4 lines 4-8.

Furthermore, the methods of Claims 1 and 20 are further distinguished from *Murrell*'s method, because *Murrell* fails to teach the calcining step (d) in these claims. Contrary to what is stated on page 3 of the Office Action, *Murrell* does not teach calcining the material obtained from the steaming step. Rather, *Murrell* teaches that the compositions are different from compositions formed (a) by high temperature steaming a composite of particles of  $\gamma$ -alumina, silica and tungsten oxide, OR (b) calcining composites of silica, tungsten oxide and boehmite. See *Murrell* Col. 3 lines 65-68. Nowhere is there in *Murrell* a teaching or suggestion that a calcination step is done after the steaming step. None of the Examples in *Murrell* discloses a calcination step after the steaming step. In fact, the steaming step is the last step which generates the final catalyst compositions in *Murrell*'s examples 1-5 (see *Murrell* Col. 5 line 46 to Col. 7 line 67).

The lack of calcination in *Murrell*'s method after the high-temperature steam treatment of the composite of boehmite, silica and tungsten oxide is most likely explained by the expressed desire from *Murrell* in creating a boehmite-like surface phase during steaming by the reaction of silica and tungsten oxide with boehmite (see *Murrell* col. 3 lines 43-63). *Murrell* would not want to negatively impact this special feature which differentiates *Murrell*'s supported catalyst from previous ones. Indeed, it is believed that a calcination performed after the creation of the boehmite-



like surface phase during steaming would most likely remove this special feature, for example by dehydration and converting this boehmite-like surface phase into an aluminum oxide surface phase.

Furthermore, *Murrell* does not disclose or suggest that the preparation method generates an aluminum oxide material with a 0.2-0.6 cc/g pore volume. Thus, it would be merely speculative to infer that the aluminum oxide in *Murrell* has a pore volume within the range recited in Claims 1 and 20.

For at least the above stated foregoing reasons, Applicant believes that the rejections over *Murrell* are not *prima facie*, and that Claims 1, 20 and their respective dependent claims are patentable over *Murrell*. Applicant respectfully requests the withdrawal of the rejections of Claims 1, 20, 22-23, 27-29, 31, 33 & 35-39 based on *Murrell*.

#### **V. Rejections over *Norweck* in view of *Watcher***

Claims 42-48, 60-66 & 75-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Norweck* in view of *Watcher*. Claims 75, 78, 85, 87-88 & 91-92 were canceled in this response. As such, Applicant will address the rejection of Claims 42-48, 60-66, 76-77, 79-84, 86 & 89-90.

The Examiner stated (Office Action, pg. 3) that *Norweck* fails to teach the making of a Fischer-Tropsch catalyst (hereinafter 'FT catalyst') and has used *Watcher* to teach steps (a) through (d) of the method for making a FT catalyst.

In view of the amendments to Claim 42 from which the other rejected claims depend, Applicant respectfully traverses the rejection of these claims based on the combination of *Norweck* with *Watcher* for lack of *prima facie* obviousness.

Applicant asserts that the combination of *Norweck* with *Watcher* does not provide all of the elements of independent Claim 42 (as required under MPEP 2143.03) and *a fortiori* of all of the elements of its respective pending dependent claims rejected on the same basis. There is further no motivation for the artisan to employ the stabilized alumina obtained from *Norweck* in making a suitable FT catalyst as described by *Watcher* in order to arrive to the present method of Claim 42.

*Watcher* teaches a process for increasing the hydrogenation activity of a catalyst, particularly the carbon monoxide (CO) hydrogenation activity by conducting a low-temperature activation treatment of a catalyst, generally comprising cobalt. See *Watcher*'s abstract. This treatment comprises

contacting a catalyst or catalyst precursor with liquid water or steam, or a mixture of liquid, water and steam, at sufficiently low temperature to oxidize and convert at least a portion of the metal, or metals component of the catalyst precursor to a metal hydroxide, low oxygen-containing metal oxide, or mixture of metal hydroxide and low oxygen-containing metal oxide. See *Watcher* Col. 2 lines 10-19. This oxidation step is followed by a reduction step (such as by contacting and treating the oxidized catalyst precursor with hydrogen). In this reduction step, the dispersed metal oxide and/or hydroxylated catalytic metal, e.g., CoO and/or Co(OH)<sub>2</sub>, are reduced to elemental or metallic metal, e.g., Co, and the catalyst is thereby activated or reactivated. *Watcher* explains the enhanced hydrogenation activity or activation by the more readily dispersion of the 'steam-contacted' metals (such as CoO and Co(OH)<sub>2</sub>) on a support than that of a higher valence oxide form (such as Co<sub>3</sub>O<sub>4</sub>). See *Watcher* Col. 2 lines 63-67.

Thus as a whole, *Watcher* discloses a method for activation or reactivation of an already-formed hydrogenation catalyst in which a catalytic metal has been deposited on a support, which result in a higher dispersion of the catalytic metal by generating greater number of metallic forms from a lower valence metal forms obtained after a contact with liquid water or steam, or a mixture of liquid, water and steam (e.g., CoO and Co(OH)<sub>2</sub>) rather than a higher valence metal form (e.g, Co<sub>3</sub>O<sub>4</sub>).

Claim 42 is distinguished from the combination of *Norweck* with *Watcher*, because this combination of references fails to teach the characteristics of the stabilized alumina obtained after the calcination step (iii) as recited in Claim 42.

Contrary to what is stated in the Office Action, there is no mention in *Watcher* of the use of a stabilized alumina in the Fischer-Tropsch synthesis. *Watcher* discloses an alumina catalyst support but in generic term. See *Watcher* Col. 4 lines 58-61. *Norweck* mentions that the resulting aluminum oxide materials can be useful as catalyst supports; however the disclosed intended use of *Norweck*'s material is not for FT catalysis but for automobile exhaust gas catalysts, which are generally designed for experiencing severe thermal conditions generally well above 1000°C. See *Norweck* Col. 4 lines 26-27 & 30-34.

Moreover, there is no suggestion from *Norweck* that *Norweck*'s catalyst with a large pore volume can make a suitable FT catalyst support. The artisan thus would see no motivation from the references themselves in using *Norweck*'s catalyst support of a high pore volume in the method of making the FT catalyst of *Watcher*.

For at least the foregoing reasons, Applicant believes that the rejections over the combination of *Norweck* with *Watcher* are not *prima facie*, and that Claim 42 and its dependent claims are patentable over such combination. Applicant respectfully requests the withdrawal of the 103(a) rejections of Claims 42-48, 60-66, 76-77, 79-84, 86 & 89-90 based on the combination of *Norweck* with *Watcher*.

#### **VI. Rejections over *Murrell* in view of *Watcher***

Claims 42-48, 60-66, 75-79 & 81-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murrell* in view of *Watcher*. Claims 75, 78, 85, 87-88 & 91-92 were canceled in this response. As such, Applicant will address the rejection of Claims 42-48, 60-66, 76-77, 79, 81-84, 86 & 89-90.

The Examiner stated that *Murrell* fails to teach the making of the FT catalyst, and has used *Watcher* for his teaching of a method for making the FT catalyst.

In view of the amendments to Claim 42 from which the other rejected claims depend, Applicant respectfully traverses the rejection of these claims based on *Murrell* in view of *Watcher* for lack of *prima facie* cases of obviousness.

Applicant submits that the combination of *Murrell* with *Watcher* does not provide all of the elements (as required under MPEP 2143.03) of independent Claim 42 and *a fortiori* of its respective pending dependent claims rejected on the same basis. Moreover, there is no guidance to the artisan from the combination of *Murrell* with *Watcher* to modify *Murrell's* teachings to arrive to the present Claim 42. For example, there is no motivation for the artisan to employ a calcination step after a steaming step, since neither reference teaches or suggests this order of steps to make a stabilized alumina catalyst support.

Contrary to what is stated on pages 5-6 of the *Office Action*, *Watcher* does not remedy to the deficiencies of *Murrell* by not providing all of the steps of making the support as recited in this claim. For example, *Murrell* does not teach that a calcination step [(c) in Claim 42] comprising a temperature between 400° C and 900° C of a stabilizer-containing material is performed after a steaming step [(a) in Claim 42] comprising a temperature between 180° C and 300° C to make the stabilized support. *Watcher* fails to provide these teachings to supplement *Murrell's* omissions.

*Watcher* discloses a low-temperature steaming treatment solely after the catalyst is made, that is to say after the catalytic metal has been deposited on the support. The low-temperature steaming is not taught to at least partially transform the transition alumina to boehmite and/or pseudoboehmite, but rather the low-temperature steaming is meant to improve the dispersion of the catalytic metal (after it has already been deposited) by providing a lower valence cobalt precursor before the reduction step.

Furthermore, there is no calcination step being carried out after the steaming step in *Watcher*'s method. Rather, *Watcher* discloses a reduction step after the steaming step.

Neither *Murrell* nor *Watcher* discloses the pore volume range of the resulting stabilized alumina recited in Claim 42.

For at least the foregoing reasons, Applicant believes that the rejections over the combination of *Murrell* with *Watcher* are not *prima facie*, and that Claim 42 and its dependent claims are patentable over such combination. Applicant respectfully requests the withdrawal of the 103(a) rejections of Claims 42-48, 60-66, 76-77, 79, 81-84, 86 & 89-90 based on the combination of *Murrell* with *Watcher*.

## **VII. Rejections over *Norweck* in view of *Van Berge***

Claims 1, 20-70 & 73-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Norweck* in view of *Van Berge*. Claims 21, 24-26, 30, 34, 40-41, 75, 78, 85, 87-88 & 91-92 were canceled in this response. As such, Applicant will address the rejection of Claims 1, 20, 22-23, 27-29, 31-33, 35-39, 42-70, 73-74, 76-77, 79-84, 86 & 89-90.

The Examiner has used *Van Berge* for his teachings of the FT catalyst preparation method and its use, both of which are not taught by *Norweck*.

In view of the amendments to Claims 1, 20, 42 and 70, Applicant respectfully traverses the rejection of these claims based on the combination of *Norweck* with *Van Berge* for lack of *prima facie* obviousness. Contrary to what is stated on page 7 of the Office Action, the combination of *Norweck* with *Van Berge* does not provide all of the elements (as required under MPEP 2143.03) of independent Claims 1, 20, 42 and 70, and *a fortiori* of all of the elements of their respective pending dependent claims rejected on the same basis. Moreover, there is no guidance to the artisan from these references to modify *Norweck*'s teachings with those of *Van Berge*. For example, there is no teaching or suggestion to substitute *Norweck*'s unusual alumina material in *Van Berge*'s method of making a FT catalyst and

its use in Fischer-Tropsch synthesis with a reasonable expectation of success (i.e., with the proper inertness that *Van Berge* seeks) to arrive to the present Claims 1, 20, 42 and 70.

As stated above, *Norweck* does not teach the resulting stabilized alumina obtained by the method of support preparation as recited in Claims 1, 20, 42 and 70. Instead, *Norweck* teaches a high-porosity alumina material of pure-phase or stable-phase delta-, theta- or alpha- alumina (*Norweck* Col. 3 lines 51-55). *Norweck*'s objective is to provide aluminum oxides with "unusual high-temperature stability and furthermore, with extraordinary large surfaces and pore volumes after calcination" (*Norweck* Col. 2 lines 1-4; emphasis added). *Norweck* teaches that the objective was to form alumina materials with unusual morphology based on the unusual dimensional differences in the space directions 0120 and 020 (*Norweck* Col. 1 lines 11-15 & lines 66-67; Col. 2 lines 5-11).

*Van Berge* as a whole disclosed the preparation of a FT catalyst and its use in Fischer-Tropsch synthesis. The preparation includes the integration of a catalyst support modification step and a pre-shaping step. See *Van Berge* Page 2, lines 26-30. The modification of the support includes the introduction of a modifying component Mc which renders the support less soluble or more inert in an aqueous solution and/or during hydrothermal attack while it is used in a FT synthesis. See *Van Berge* Page 3, lines 4-9. This increased inertness is believe to prevent the catalytic metal (Co) from readily dislodging and washing out into the wax product during its operation in a slurry phase Fischer-Tropsch reactor. See *Van Berge* Page 1, lines 20-27

Applicant argues however that *Van Berge* does not remedy to the deficiencies of *Norweck*. Indeed, *Van Berge* does not teach the modifications necessary to *Norweck*'s method in order to obtain the catalyst support as prepared by the methods recited in independent Claims 1, 20, 42 and 70.

Even if, *arguendo*, the alleged modifications of *Norweck*'s method were disclosed or suggested, it would be hard to predict with a reasonable expectation of success by the artisan whether the resulting alumina material obtained by the modified method (suggested by the Examiner) would retain the unusual morphology that *Norweck* is seeking and highlighting as a key feature for providing the "unusual high-temperature stability".

Furthermore, there is no indication from either reference whether the "unusual morphology" of *Norweck*'s stabilized alumina will provide the desired inertness towards dissolution in an aqueous environment during the impregnation of the catalytic metal (such as cobalt) and/or the desired inertness

towards hydrothermal attack during FT synthesis, both of which *Van Berge* sought for stabilizing the FT catalyst (see *Van Berge* Page 3, lines 4-9; Page 6, lines 9-15).

There is further no teaching or suggestion from the references themselves to employ the high-porosity alumina material of pure-phase delta-, theta- or alpha- alumina obtained by *Norweck*'s method in the preparation and use of the FT catalyst taught by *Van Berge* to arrive to the present Claims 1, 20, 42 and 70. Indeed, there is no teaching or suggestion from *Norweck* and *Van Berge* whether the high-porosity alumina material of pure-phase delta-, theta- or alpha- alumina of *Norweck* would be a suitable substitute for the "successful catalyst support" used by *Van Berge* (see *Van Berge* Page 2 lines 26-30). Applicant argues that the artisan would have no reasonable expectation that *Norweck*'s high-porosity alumina material (stabilized for high-temperature applications) would retain the unusual morphology desired by *Norweck*, and would additionally have the inertness towards dissolution in an aqueous environment during the impregnation of the catalytic metal (such as cobalt) and/or would have the desired inertness towards hydrothermal attack during FT synthesis, both of which are sought by *Van Berge* (see *Van Berge* Page 3, lines 4-9; Page 6, lines 9-15).

Moreover, *Norweck* teaches a method of preparation which avoids the use of 'stabilization aids' (*Norweck* Col. 4 lines 35-39), while *Van Berge* teaches that the stabilized support must have a modifying component Mc (*Van Berge* Page 3, lines 6-9). These are clearly opposite trends, which are antithetical and thus uncombinable.

Applicant could not find in the references themselves the factual support to the assertions in the Office Action that the artisan would be motivated to use the support of *Norweck* in the method of *Van Berge* for making a FT catalyst and using it in the FT process of *Van Berge*.

For at least the foregoing reasons, Applicant believes that the rejections over the combination of *Norweck* with *Van Berge* are not *prima facie*, and further that Claims 1, 20, 42, 70 and their respective dependent claims are patentable over such combination. Applicant respectfully requests the withdrawal of the 103(a) rejections of Claims 1, 20, 22-23, 27-29, 31-33, 35-39, 42-70, 73-74, 76-77, 79-84, 86 & 89-90 based on the combination of *Norweck* with *Van Berge*.

#### **VIII. Rejections over *Murrell* in view of *Van Berge***

Claims 1, 20-31, 33-70, 73-79 & 81-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murrell* in view of *Van Berge*. Claims 21, 24-26, 30, 34, 40-41, 75, 78, 85, 87-88

& 91-92 were canceled in this response. As such, Applicant will address the rejection of Claims 1, 20, 22-23, 27-29, 31, 33, 35-39, 43-69, 73-74, 76-77, 79-84, 86 & 89-90.

The Examiner has used *Van Berge* for his teachings of the FT catalyst preparation method and its use, both of which are not taught by *Murrell*.

In view of the amendments to Claims 1, 20, 42 and 70 from which the other rejected claims depend, Applicant respectfully traverses the rejection of these claims based on the combination of *Murrell* with *Van Berge* for lack of *prima facie* obviousness.

Applicant asserts that the combination of *Murrell* with *Van Berge* does not provide all of the elements (as required under MPEP 2143.03) of independent Claims 1, 20, 42 and 70, and *a fortiori* does not provide all of the elements of their respective pending dependent claims rejected on the same basis. Moreover, there is no teaching or suggestion from the references themselves to modify *Murrell's* teachings with those of *Van Berge* to arrive to the present Claims 1, 20, 22-23, 27-29, 31, 33, 35-39, 43-69, 73-74, 76-77, 79-84, 86 & 89-90. For example, an artisan would not be motivated to modify *Murrell's* method as suggested by the Examiner since the addition of a calcination step would most likely result in removing a key feature of *Murrell's* catalyst that sets it apart from other cracking catalysts.

As stated above, *Murrell* does not teach the method of making the support recited in Claims 1, 20, 42 and 70. Instead, *Murrell* teaches a steam treatment of boehmite (not alumina) at high temperature (of at least 500°C) to gamma-alumina (the reverse conversion recited in Claims 1, 20, 42 and 70) and further fails to teach a calcination step after the steaming step is carried out. Only a reduction step is disclosed after the steaming step of the catalyst material (with active metal).

Applicant argues that *Van Berge* does not remedy to the deficiencies of *Murrell*. Indeed, *Van Berge* does not teach the modifications necessary to the steaming step in *Murrell's* method in order to obtain the methods of catalyst support preparation recited in Claims 1, 20, 42 and 70.

Additionally, even though a calcination step may be used in *Van Berge* during the catalyst support preparation step (see *Van Berge* Page 6, lines 9-15), it is likely that, if a calcination were performed after the steaming step in *Murrell's* method, the calcination would cause the conversion of the boehmite-like surface phase in *Murrell's* catalyst into an aluminum oxide surface phase. Since this characteristic differentiates *Murrell's* catalyst composition from previous ones (*Murrell*

Col. 3, lines 58-60), there seems to be no motivation for the artisan to negatively impact or even remove the boehmite-like surface phase by calcining *Murrell*'s material.

Contrary to what the Examiner stated, there is no teaching or suggestion from *Murrell* that the silica-tungsten oxide alumina could be used as a support in the FT synthesis of *Van Berge*.

There is also no teaching or suggestion that the use of *Murrell*'s material (with the silica and tungsten-oxide boehmite-like surface phase) as catalyst support in *Van Berge*'s process would be able to provide a clean wax product (see *Van Berge* Abstract). To the contrary, it is generally known that boehmite is partially soluble in aqueous solutions, and thus a catalyst support comprising a boehmite-like surface phase would not be expected to provide the desired inertness against dissolution (for example in an aqueous solution of the catalytic metal) that *Van Berge* is seeking for a successful catalyst support used in FT synthesis. Applicant has shown for example that the presence of boehmite material in the catalyst support results in disintegration of the supported catalyst, and it is believed by Applicant that the formation of boehmite in the catalyst support during FT synthesis is one of the root causes of FT catalyst attrition in slurry phase reactors. See Applicant paragraph [0083] on page 33 and [0085] on page 34 of the specification as filed.

For at least the foregoing reasons, Applicant believes that the rejections over the combination of *Murrell* with *Van Berge* are not *prima facie*, and that Claims 1, 20, 42 and 70 and their respective dependent claims are patentable over the combination of these references. Applicant respectfully requests the withdrawal of the 103(a) rejections of Claims 1, 20, 22-23, 27-29, 31, 33, 35-39, 43-69, 73-74, 76-77, 79-84, 86, 89-90 based on the combination of *Murrell* with *Van Berge*.

#### **IX. Rejections over *Norweck* in view of *Khare***

Claims 1, 20-70 and 73-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Norweck* in view of *Khare*. Claims 21, 24-26, 30, 34, 40-41, 75, 78, 85, 87-88 & 91-92 were canceled in this response. As such, Applicant will address the rejection of Claims 1, 20, 22-23, 27-29, 31-33, 35-39, 42-70, 73-74, 76-77, 79-84, 86 & 89-90.

The Examiner has used *Khare* for his teachings of the FT catalyst preparation method and its use, both of which are not taught by *Norweck*.



In view of the amendments to independent Claims 1, 20, 42 and 70, Applicant respectfully traverses the rejection of these claims based on *Norweck* in view of *Khare* for lack of *prima facie* obviousness.

Applicant asserts that the combination of *Norweck* with *Khare* does not provide all of the elements (as required under MPEP 2143.03) of independent Claims 1, 20, 42 and 70, and *a fortiori* of all of the elements of their respective pending dependent claims rejected on the same basis. Moreover, there is no guidance to the artisan from the combination of *Norweck* with *Khare* to modify *Norweck*'s teachings to arrive to the present Claims 1, 20, 42 and 70. For example, there is no teaching or suggestion from these references to substitute *Norweck*'s unusual alumina material in *Khare*'s method of making a FT catalyst and its use in Fischer-Tropsch synthesis with a reasonable expectation of success, as required by MPEP 2143.01 for *prima facie* obviousness.

*Khare*, as a whole, disclosed the preparation of a FT catalyst and its use in Fischer-Tropsch synthesis. The preparation includes impregnating a particulate carrier with an active metal selected from cobalt, iron, manganese, nickel and mixtures thereof by mixing the particulate carrier with a particulate compound of containing said active metal at a temperature approximately at or above the melting point of the active metal compound but below the temperature at which such compound decomposes, and then calcining the thus impregnated carrier to produce the catalyst. See *Khare* Abstract, Page 2 lines 2-9. The resulting Fischer-Tropsch catalyst differs from other FT catalysts (in which the active metal is concentrated on the outer surfaces of the carrier particles) in that there is substantial penetration of the active metal in the carrier particles. See *Khare* Page 2, lines 11-14. This deeper penetration of the active metal generally enhances selectivity and/or activity, and can also minimize attrition or loss of active metal from the carrier particles and consequent contamination of the hydrocarbon product. See *Khare* Page 2, lines 14-17. *Khare* discloses alumina as one of the many materials suitable as carrier. See *Khare* Page 3 lines 2-5.

Applicant argues however that *Khare* does not remedy to the deficiencies of *Norweck*. Indeed, *Khare* does not teach the modifications necessary to *Norweck*'s method in order to obtain the catalyst support as prepared by the method recited in Claims 1, 20, 42 and 70.

As stated above, *Norweck* does not teach the resulting stabilized alumina obtained by the method of support preparation as recited in Claims 1, 20, 42 and 70. Instead, *Norweck* teaches a high-porosity alumina material of pure-phase or stable-phase delta-, theta- or alpha- alumina (*Norweck* Col. 3 lines 51-55). *Norweck*'s objective is to provide aluminum oxides with "unusual high-temperature

stability and furthermore, with extraordinary large surfaces and pore volumes after calcination” (*Norweck* Col. 2 lines 1-4). *Norweck* teaches that his objective was obtained by forming alumina materials with unusual morphology based on the unusual dimensional differences in the space directions 0120 and 020 (*Norweck* Col. 1 lines 11-15 & lines 66-67; Col. 2 lines 5-11).

There is further no teaching or suggestion from these two references themselves to employ the high-porosity alumina material of pure-phase delta-, theta- or alpha- alumina obtained by *Norweck*’s method in the preparation and use of the FT catalyst taught by *Khare* to arrive to the present Claims 1, 20, 42 and 70. Indeed, there is no indication from *Norweck* and *Khare* whether the high-porosity alumina material of pure-phase delta-, theta- or alpha- alumina of *Norweck* would be suitable as the carrier in *Khare*’s method and process.

Applicant further argues that the artisan has no reasonable expectation that *Norweck*’s high-porosity alumina material stabilized for high-temperature applications would have a desired morphology and the desired pore volume for FT synthesis.

Moreover, *Norweck*’s method of preparation aims at avoiding the use of stabilizing aids and *Khare* does not suggest in having to use stabilization aids in the carrier. Thus, their combination would not lead the artisan towards the use of structural stabilizer as recited in the present claimed methods.

Additionally, *Norweck* does not suggest forming an alumina with a 0.2-0.6 cc/g pore volume as recited in Claims 1, 20, 42 & 70, and *Khare* does not suggest using such alumina as a carrier in the making of the FT catalyst for its ultimate use in making hydrocarbons from synthesis gas.

For at least the foregoing reasons, Applicant believes that the rejections over the combination of *Norweck* with *Khare* are not *prima facie*, and that Claims 1, 20, 42, 70 and their respective dependent claims are patentable over this combination. Applicant respectfully requests the withdrawal of the 103(a) rejections of Claims 1, 20, 22-23, 27-29, 31-33, 35-39, 42-70, 73-74, 76-77, 79-84, 86 & 89-90 based on the combination of *Norweck* with *Khare*.

#### **X. Rejections over *Murrell* in view of *Khare***

Claims 1, 20-31, 33-70, 73-79 and 81-92 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Murrell* in view of *Khare*. Claims 21, 24-26, 30, 34, 40-41, 75, 78, 85, 87-88 & 91-92 were canceled in this response. As such, Applicant will address the rejection of Claims 1, 20, 22-23, 27-29, 31, 33, 35-39, 43-69, 73-74, 76-77, 79-84, 86 & 89-90.

The Examiner has used *Khare* for his teachings of the FT catalyst preparation method and its use in Fischer-Tropsch synthesis, both of which are not taught by *Murrell*.

In view of the amendments to Claims 1, 20, 42 and 70 from which the other rejected claims depend, Applicant respectfully traverses the rejections of these claims based on the combination of *Murrell* with *Khare* for lack of *prima facie* obviousness.

Applicant asserts that the combination of *Murrell* with *Khare* does not provide all of the elements (as required under MPEP 2143.03) of independent Claims 1, 20, 42 and 70, and *a fortiori* of all of the elements of their respective pending dependent claims rejected on the same basis. Moreover, there is no guidance from the combination of *Murrell* with *Khare* to modify *Murrell's* teachings to arrive to the present Claims 1, 20, 42 and 70. for example, there is no teaching or suggestion given to the artisan in modifying *Murrell's* method by adding a calcination step which most likely would result in removing a key feature of *Murrell's* catalyst that sets it apart from other cracking catalysts.

*Khare* addresses the Co contamination in the wax product by using a deeper penetration technique in order to minimize loss of active metal from carrier particles. However, *Khare* does not teach nor suggest any modification of the carrier particles to prevent its disintegration during synthesis and subsequent contamination of the hydrocarbon product. Thus there is no suggestion from these references in steaming an alumina carrier before or after impregnating a structural stabilizer into said carrier, so that the resulting alumina carrier would be stable enough to sustain the hydrothermal conditions of the FT synthesis.

Applicant submits however that *Khare* does not remedy to the deficiencies of *Murrell*.

As stated above, *Murrell* does not teach the method of making the support as recited in Claims 1, 20, 42 and 70. Instead, *Murrell* teaches a steam treatment of boehmite (not alumina) at high temperature (of at least 500°C) to gamma-alumina (the reverse conversion recited in Claim 42) and further fails to teach a calcination set after the steaming step is carried out. *Khare* does not teach the modifications necessary to the steaming step in *Murrell's* method in order to obtain the catalyst support as prepared by the method recited in Claims 1, 20, 42 and 70. *Khare* in fact does not disclose specific steps for making an alumina support.

For at least the foregoing reasons, Applicant believes that the rejections over the combination of *Murrell* with *Khare* are not *prima facie*, and that Claims 1, 20, 42, 70 and their respective dependent

claims are patentable over this combination. Applicant respectfully requests the withdrawal of the 103(a) rejections of Claims 1, 20, 22-23, 27-29, 31, 33, 35-39, 43-69, 73-74, 76-77, 79-84, 86 & 89-90 based on the combination of *Murrell* with *Khare*.

**XI. New Claims 93-101 are allowable**

Applicant added new dependent Claims 93-101 in order to cover additional embodiments of the invention to which the Applicant is entitled. Applicant respectfully requests that these new claims be considered as part of the application and be examined.

These new claims do not constitute new matter, and are supported by the application as originally filed (where original claims, paragraph numbers and page numbers originate from the specification as filed), as follows.

- Claim 93 dependent from Claim 70 is supported by at least original Claim 71.
- Claim 94 dependent from Claim 70 is supported by at least original Claim 72.
- Claim 95 dependent from Claim 1 is supported by at least paragraph [0046] on pg. 17 and Examples 1 and 2 in paragraphs [0077]-[0078] on pg. 30.
- Claims 96 dependent from Claim 1 is supported by at least Example 1 in paragraph [0077] on pg. 30.
- Claims 97 dependent from Claim 1 is supported by at least Example 1 in paragraph [0078] on pg. 30.
- Claim 98 dependent from Claim 1 is supported by at least paragraphs [0040]-[0041] on pg. 16.
- Claim 99 dependent from Claim 20 is supported by at least paragraphs [0044]-[0045] on pg. 17.
- Claim 100 dependent from Claim 20 is supported by at least Example 3 1 in paragraph [0079] on pg. 31.
- Claim 101 dependent from Claim 42 is supported by at least paragraphs [0040]-[0041] on pg. 16 and [0044]-[0045] on pg. 17.

Each of new Claims 93-101 ultimately depends from one of the independent Claims 1, 20, 42, 70 which Applicant submits are patentable over the cited art as explained previously. As such, since each of these new claims carries with it all of the limitations of the allowable independent claim from which it depends, new Claims 93-101 are *a fortiori* patentable as well, and Applicant respectfully requests their allowance.

**XII. PTO-1449 forms erroneously entered into the record of the present Application**

Applicant has noted that two PTO-1449 forms (stamped by OIPE on January 8, 2004) which were entered into the record of the present application were not submitted by Applicant.

Applicant believes that a clerical error on the serial number on these forms may have caused the improper insertion of these forms into the Image File Wrapper of the present Application (in the PTO PAIR system). According to public PAIR, these two PTO-1449 forms appear to be meant for another application with docket No. H1799-00226 and Serial No. 10/697,147 in the name of another Applicant (Todd Wenger *et al*). The serial number on these PTO-1449 forms appeared to have been manually corrected to 10/687,147 which resulted in the erroneous entry in the record of the present Application.

Since Applicant has not submitted these forms, Applicant would prefer that these two PTO-1449 forms and their enclosed cited art be removed from the record.

**XIII. Conclusion**

Applicant believes that this Response fully responds to the Office Action dated May 3, 2007. Applicant concurrently requests a one-month extension by submitting herewith a Petition for Extension of Time (PTO/SB/22) and the corresponding fee payment (\$120) to extend the time period for reply to September 4, 2007, as Monday September 3, 2007 is Labor Day, a Federal holiday. As such, the filing of this Response is deemed timely.

Applicant further submits that no new matter was added to the Application by way of amendments to the claims and by addition of new claims.

Applicant believes that all of the pending Claims 1, 20-22-23, 27-29, 31-33, 35-39, 42-70, 73-74, 76-77, 79-84, 86, 89-90 & 93-101 are patentable over the cited art. Applicant respectfully solicits their immediate allowance.

In an effort to simplify the issues for consideration by the Examiner, Applicant has generally limited this discussion to the rebuttal of the rejections of the independent Claims 1, 20, 42 and 70. Because the rejected dependent claims contain all of the limitations of these allowable independent claims, these dependent claims are allowable as a matter of law. However, Applicant respectfully reserves the opportunity to clarify the teachings of such references in the future on such dependent claims if necessary.

Appln. No. **10/687,140**  
Response Dated August 31, 2007  
Reply to Office Action of May 3, 2007

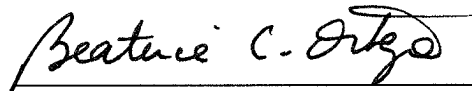
Applicants believe that the cancellation of 15 claims (i.e., Claims 21, 24-26, 30, 34, 40-41, 75, 78, 85, 87-88, 91-92) in this Response is sufficient to cover the addition of 9 new claims (i.e. Claims 93-101), and that no additional claim fee is required as the result of this claim amendment because neither the total number of pending claims (now 66) nor the number of pending independent claims (now 4) does not exceed the total number (72) and the number of independent claims (4) for which fees have previously been paid.

Should any fees have been inadvertently omitted, or if any additional fees are required or have been overpaid, or in the event that an extension of time is necessary in order for this submission to be considered timely filed, the Commissioner is authorized to appropriately charge or credit those fees to **Deposit Account Number 16-1575** and consider this a petition for any additional necessary extension of time.

If the Examiner has any questions or comments or otherwise feels it would be advantageous, the Examiner is encouraged to telephone the undersigned at (281) 293-4751.

Respectfully submitted,

CONOCOPHILLIPS COMPANY - IP LEGAL



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Date: August 31, 2007